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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/986,447	12/08/97	LIFSON	A 8927

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EXAMINER
TINKER, S

ART UNIT	PAPER NUMBER
3744	

DATE MAILED: 02/01/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
08/986,447

Applicant(s)
Lifson

Examiner
Susanne Tinker

Group Art Unit
3744



☒ Responsive to communication(s) filed on Oct 26, 1998

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-8 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1, 2, and 6-8 is/are rejected.

☒ Claim(s) 3-5 is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 2

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Benevelli et al.

Benevelli et al discloses a system serially including a compressor (31), a discharge line (36), a condenser (37), an expansion device (47), an evaporator (48), and a suction line (53 + 54 + 61), and a means for achieving capacity control comprising a solenoid valve (50) in the suction line with a means for modulating the solenoid valve such that the rate of flow in the suction line is modulated. That is, referring to column 6, line 8 through column 7, line 36, Benevelli et al discloses how the solenoid valve is modulated to yield a proportional control effect over the valve by modifying the pulse signals sent by the controller. The examiner takes Official Notice that the rapid pulsing of a solenoid valve, as claimed by applicant, is notoriously old and well known in the art of fluid handling for the purpose of modulating flow through the valve. By modifying the conventional pulse control over the valve, Benevelli et al has simply improved upon what is normally done in the art, which is the type of pulse modulation that applicant is claiming.

Therefor, it would have been obvious to one having ordinary skill in the art at the time of applicant's invention to have modified Benevelli et al's proportional modulation of the valve

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through the transformation of the pulse signals by substituting the straightforward pulse modulation of the valve in order to provide simpler control circuitry within the system.

Claims 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Benevelli et al in view of Ohman. Benevelli et al discloses a system serially including a compressor (31), a discharge line (36), a condenser (37), an expansion device (47), an evaporator (48), and a suction line (53 + 54 + 61), and a means for achieving capacity control comprising a solenoid valve (50) in the suction line with a means for modulating the solenoid valve such that the rate of flow in the suction line is modulated. That is, referring to column 6, line 8 through column 7, line 36, Benevelli et al discloses how the solenoid valve is modulated to yield a proportional control effect over the valve by modifying the pulse signals sent by the controller. The examiner takes Official Notice that the rapid pulsing of a solenoid valve, as claimed by applicant, is notoriously old and well known in the art of fluid handling for the purpose of modulating flow through the valve. By modifying the conventional pulse control over the valve, Benevelli et al has simply improved upon what is normally done in the art, which is the type of pulse modulation that applicant is claiming. Therefor, it would have been obvious to one having ordinary skill in the art at the time of applicant's invention to have modified Benevelli et al's proportional modulation of the valve through the transformation of the pulse signals by substituting the straightforward pulse modulation of the valve in order to provide simpler control circuitry within the system. Benevelli et al discloses applicant's basic inventive concept. However, Benevelli et al does not disclose a fluid path connected to the compressor at a location corresponding to an intermediate point of

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compression in the compressor. Ohman teaches the concept of a refrigeration circuit having a fluid path (22) connected to the compressor (11) at a location (27) corresponding to an intermediate point of compression in the compressor for the purpose of allowing the evaporator to provide more cooling heat transfer. It would have been obvious to one having ordinary skill in the art at the time of applicant's invention to have modified the system of Benevelli et al by including the type of fluid path which is connected to the compressor at a location corresponding to an intermediate point of compression in the compressor as taught by Ohman in order to allow the evaporator to provide better heat transfer due to the reduced mass flow through the evaporator.

Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohman.

Ohman discloses a system serially including a compressor (11) a discharge line (18), a condenser (12), an expansion device (13 or 15), an evaporator (16) a suction line (21), and a means for achieving capacity control comprising a fluid path (22 +23) connected to the compressor at a location corresponding to an intermediate point of compression in the compressor, a bypass line (24) connected to the fluid path and the suction line, a solenoid valve (17) in the bypass line and a means for modulating the rate of flow in the bypass line to the suction line (i.e. proportional position controller system (28 +29). Ohman further discloses an economizer circuit (14) connect to the fluid path and teaches providing a second valve means in the economizer circuit (see column 4, lines 63-67). Ohman discloses applicant's basic inventive concept substantially as claimed with the exception of disclosing the type of pulse control over the valve in order to

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modulate the flows in the various flow lines. The examiner takes Official Notice that the rapid pulsing of a solenoid valve, as claimed by applicant, is notoriously old and well known in the art of fluid handling for the purpose of modulating flow through the valve. Therefor, it would have been obvious to one having ordinary skill in the art at the time of applicant's invention to have modified the proportional modulation of the valves by incremental position control of Ohman by substituting pulse modulation of the valve in order to provide simpler control circuitry within the system since positioning of the valve precisely takes a much more sophisticated control system than a rapid pulsing technique by which the rapid pulsing between essentially two positions effects and average positioning depending on the duty cycle of the pulses.

Allowable Subject Matter

Claims 3-5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. De Medio teaches the concept of a fluid path connected to an intermediate point of compression of the compressor in a refrigeration circuit. Englund teaches the concept of a fluid path having an economizer circuit and a bypass line in a refrigeration system. Wood teaches the

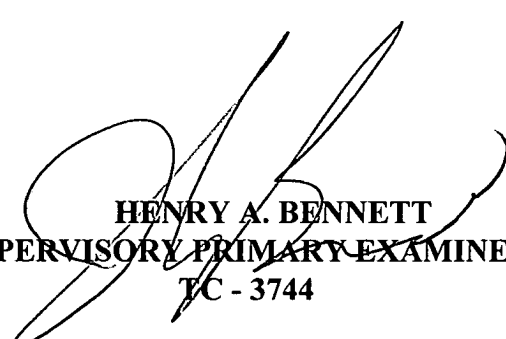
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concept of a solenoid valve in a refrigeration circuit which is controlled by rapidly pulsing the valve between two positions to maintain an average opening of the valve in order to modulate the amount of refrigerant flowing through a line. Naruse et al teaches the concept of a refrigeration system having an economizer circuit and a bypass line.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susanne Tinker whose telephone number is (703) 308-2637.


SCT

January 18, 1999


HENRY A. BENNETT
SUPERVISORY PRIMARY EXAMINER
TC - 3744